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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/647,773	08/25/2003	Mahesh Sanganerla	NOVE10003800	2781
22891	7590	12/29/2004	EXAMINER	
DELIO & PETERSON 121 WHITNEY AVENUE NEW HAVEN, CT 06510			TRAN, MINH LOAN	
			ART UNIT	PAPER NUMBER
			2826	

DATE MAILED: 12/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/647,773

Applicant(s)

SANGANERIA ET AL.

Examiner

Minh-Loan T. Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 October 2004.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
4a) Of the above claim(s) 24-29 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-15 and 21-23 is/are rejected.
7) ☒ Claim(s) 16-20 is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 26 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Group I, claims 1-23 in the reply filed on 10/06/2004 is acknowledged. The traversal is on the ground(s) that 35 USC § 121 authorizes restriction only when the claimed invention is "independent and distinct" and a search of the subject matter of Group I, claims 1-23, drawn to a process, would necessarily require a search of the subject matter of Group II, claims 24-29, which are drawn to a semiconductor structure. This is not found persuasive because even though 35 USC 121 authorizes restriction of two or more independent and distinct inventions, the term "and" has long been understood as "or". The law has long been established that dependent inventions (frequently termed related inventions) may be properly divided if they are, in fact "distinct" inventions, even though dependent. The term "distinct" means that two or more subjects as disclosed are related, for example as combination and subcombination, process and apparatus for its practice, process and product made, etc., but are capable of separate manufacture, use or sale as claimed, **and are patentable** (novel and unobvious) **over each other** (though they may each be unpatentable because of the prior art.) It will be noted that in this definition the term "related" is used as an alternative for "dependent" in referring to subjects other than independent subjects. See MPEP 802.01. Furthermore every requirement to restrict has two aspects, (1) the reasons (as distinguished from the mere statement of conclusion) why the inventions as claimed are either independent or distinct, and (2) the reasons for insisting upon restriction therebetween. See MPEP 808. Where the related inventions

as claimed are shown to be distinct under the criteria of MPEP 806.05 (c-I), the examiner, in order to establish reasons for insisting upon restriction, must show by appropriate explanation one of the following : (1) separate classification thereof, (2) a separate status in the art when they are classifiable together, or (3) a different field of search. See MPEP 808.02.

The restriction requirement for Group I (claims 1-23) and Group II (claims 24-29) which are related as process of making and product made, sets forth a two way distinction between the inventions of Group II and Group I. In another words, the process of Group I could be used to fabricate other and materially different product such as any semiconductor device having conductive plugs. On the other hand, the product of Group II could be made by another and materially different process such as the process of forming the device of claim 24 can be materially altered by forming a treated surface area of the insulating film without the step of heating the substrate and the insulating film. Thus the inventions of Group I and Group II are distinct inventions. See MPEP 806.05 (f). In addition, said Group II is classified in class 257 and said Group I is classified in class 438, as set forth in the Restriction Requirement. Thus the inventions of Group I and Group II acquire a separate classification thereof. Therefore, the requirement for restriction between patentably distinct inventions of Group I and Group II is proper. See MPEP 808 and 808.02.

The requirement is still deemed proper and is therefore made FINAL.

Information Disclosure Statement

2. If applicant is aware of any relevant prior art, he/she requested to cite it on form **PTO-1449** in accordance with the guidelines set forth in M.P.E.P. 609.

Oath/Declaration

3. The oath or declaration filed on 08/26/03 is acceptable.

Drawings

4. The drawings filed on 08/26/2003 are acceptable.

Claim Rejections - 35 USC § 112

5. Claims 1-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, line 13, "said insulating layers" lacks of antecedent basis because there is only one insulating layer introduced.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-4, 6, 7, 9-15, 21-23 are rejected under 35 U.S.C. 102(e) as being anticipated by Lu et al. (2004/0018748).

With regard to claims 1, 6, 9, 15, 21, figures 2A-2D, 3 of Lu et al. disclose a method of improving adhesion between an insulating layer 28 and a capping layer 30 in a process for making electronic components comprising: providing an integrated circuit structure which is in the process of being fabricated into finished electronic component having an insulating layer 28; contacting an exposed surface of the insulating layer 28 with a gas for adsorption of the gas onto the exposed surface of the insulating layer 28 for forming a treated surface area of the insulating layer 28 while maintaining an original thickness of the insulating layer 28 (note paragraphs [0020] and [0021] of Lu et al.); depositing a capping layer 30 that is made of silicon carbide directly over the treated surface area of the insulating layer 28 and continuing the process for making the integrated circuit device; wherein the treated surface area of the insulating layer 28 improves adhesion between the insulating layer 28 and the capping layer 30 so that the delamination therebetween during the step of continuing the process of making the integrated circuit can be prevented (note lines 29-40 in paragraph [0026], lines 7-21 in paragraph [0029] of Lu et al.)

With regard to claims 2, 3 and 13, paragraph [0029] of Lu et al. discloses the insulating layer 28 has a thickness ranging from about 3,000 Å to 10,000 Å and comprises a low K dielectric.

With regard to claims 4 and 12, paragraph [0017] of Lu et al. discloses the low k dielectric material of the insulating layer 28 comprises organo-silicate glass.

With regard to claims 7, 14, paragraphs [0020], [0021] of Lu et al. disclose the insulating layer 28 is preheated to a temperature equal to the process temperature prior

to performing the plasma process e.g. 300 ° C to 400 ° C and the gas is flow over the exposed surface of the heated insulating layer 28 for a duration about 30 seconds to about 120 seconds with a flow rate of 60 scam to about 200 scam.

With regard to claims 10 and 11, figures 2A-2D of Lu et al. disclose the step of depositing a dielectric layer 26 over the substrate layer 20 followed by depositing the low k insulating layer 28 over the dielectric layer 26; wherein the dielectric layer 26 having a thickness ranging from 300 Å to 1000 Å (note paragraph [0028] of Lu et al.)

With regard to claims 22 and 23, figures 2B-2D and paragraphs [0031]-[0034] of Lu et al. disclose the steps of forming the photo resist plugs in the insulating layer 28 and the steps of depositing a metallization layer 34 to fill the via openings and trenches openings 31A, 31B and planarizing a surface of the semiconductor device.

Allowable Subject Matter

7. Claims 16-20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. Claims 5 and 8 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Minh-Loan T. Tran whose telephone number is (571)


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272-1922. The examiner can normally be reached on Monday-Friday 9:00 AM-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J. Flynn can be reached on (571) 272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mlt
12/04


Minh-Loan T. Tran
Primary Examiner
Art Unit 2826